

*Introduction to*

**Engineering**

**Skills**

**Development**

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# TABLE OF CONTENTS

## **Part 1     Governing Documents**

### **INTRODUCTION**

- A - Your Role
- B - The Design of Programmed Texts
- C – Objectives for ESD text

### **THE CONTRACT**

- A – Defined
- B – A Look at a Contract

### **SPECIFICATIONS &**

### **SUPPLEMENTAL SPECIFICATIONS**

# TABLE OF CONTENTS

## **Part Two Manuals and Guiding Documents**

### **CHAPTER 4 CONSTRUCTION MANUAL, FIELD CONSTRUCTION MEMOS & OTHERS**

- Construction Manual
- Field Construction Memos (FCM's)
- Source Documents
- Qualified Products Lists (QPL's)
- Sampling ,Testing and Inspection Manuals
- Manual of Uniform Traffic Control Devices
- MOG's and SOP's

### **CHAPTER 5 CONCLUSION**

## PART 1 CHAPTER 1 - INTRODUCTION

### A - Your Role

As a construction inspector for the Georgia Department of Transportation, you have a crucial job. You are responsible for assuring that the construction work on GDOT projects is done according to the contract stipulations and meets the specification requirements. These projects range in cost from several hundred thousand dollars to several million dollars. All of which are paid from the taxes of the state's citizens. They expect the work to be done properly and to get work that will serve them well for many years.

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As an inspector you are "the (Chief) Engineer's authorized representative assigned to make detailed inspection of Contract performance of any and all portions of The Work or materials thereof."

---

You are authorized to inspect all work done and materials furnished. Such inspection may extend to all or any part of The Work and to the preparation, fabrication or manufacture of materials used.

**1-1** (d) the left  
hand side of the  
preceding even  
page

There are three phrases in the above description of your responsibility that carry a lot of implications. First, *authorized* means that you have the right to inspect anything involved the project and covered by the contract and associated documentation.

Second, the words *detailed inspection* convey the potential complexity of your job. Third, the words “*all portions* of The Work or materials” convey the magnitude of your job.

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It is self-evident that any GDOT construction project involves a multitude of things an inspector must consider to do his or her job. This is the first in a series of programmed texts that you, as an inspector for the GDOT, will be using to become better prepared to do your job.

---

YOU ARE **NOT AUTHORIZED** TO *ALTER OR WAIVE* THE PROVISIONS OF THE CONTRACT. YOU ARE **NOT AUTHORIZED** TO *ISSUE INSTRUCTIONS CONTRARY TO THE PLANS AND SPECIFICATIONS OR TO ACT AS FOREMAN FOR THE CONTRACTOR*. (Standard Specifications 105.10 **Duties of the Inspector**)

---

This means everything about the project or work should be inspected. The Chief Engineer can request the contractor to remove or uncover any portions of the finished work for inspection before it is finally accepted. If after the inspection, the work and materials prove to be acceptable, then the cost of the removal and replacement work will be paid by the Department as Extra work.

---

If, however, the uncovered work proves to be unacceptable, the contractor must re-do the uncovered work and replace the removed material. This work is at the contractor's own expense unless the Department's representative FAILED to inspect the work AFTER having been given reasonable notice in writing that The Work was to be performed. If the inspector failed to inspect the work, then the contractor may have cause for claiming a delay and the Department will end up paying for the work. YOU MUST BE THERE TO INSPECT THE WORK WHEN IT IS READY FOR INSPECTION!

## **B - The design of programmed texts**

This text introduces you to the documents and manuals you will be using in your inspection job as either legal documents or as references. This book is a programmed-text where you will be given some blocks of information and asked questions about this information. You should write your answer in the space provided and then check your answer by turning the page. Answers for odd-numbered pages will be found on the right hand side of the odd-numbered page that follows the question. Answers for even-numbered pages will be found on the left hand side of the even-numbered page that preceded the page with the question.

---

### **1-1 Circle the letter of the correct answer.**

The answer to this question will be found on

- a) the right hand side of the following odd page
  - b) the left hand side of the following even page
  - c) the right hand side of the preceding odd page
  - d) the left hand side of the preceding even page
- 

You should turn the left edge of this page back to reveal the correct answer on page 6.

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The design of programmed texts allows you to study the information at your own pace and gain a better comprehension of the material by actively recalling information through the question/answer portions of the text. You are able to get immediate feedback as to the correctness of your answer by turning the page.

---

Studies have shown that we remember more (up to 90%) when we actively perform new tasks. When you respond to the questions and compare your answer you become more involved in the learning process. (Studies have shown we only retain about 10% of the information of what we read without any other activity.)

---

If, when you compare your answer to the correct answer, you find yours does not agree, you should go back over the material to see what information you missed. This text isn't lengthy but it contains concepts which you *should master to effectively perform your inspection duties*. Reviewing the information on questions you miss, better prepares you to master the information.

---

1-2 authorized

1-3 (a) TRUE

1-4 (a) TRUE

## C – Objective of this Introductory ESD Text

This text employs a slightly different technique from the one that you will use in the other texts in this engineering skills development program. Most of the texts you will be studying will be self-contained, that is, all the information to answer the questions will be in the text. For ***Introduction to Engineering Skills Development*** you will need to refer to documents or manuals that should be available in all area or project offices. These documents / manuals (1) are too bulky to carry back and forth and (2) are vitally needed in the office. Therefore, you will probably do most of your study preparation in the project office.

---

The objective of this text is to familiarize you with the documents and references you will be using in the performance of your job. You will use actual reference manuals available in the project office and a supplemental package issued with this text to research and answer most of the questions contained in this book. When you test out on this text, the required materials will be available to you at the examination site.

You will be provided a basic contract along with other material to go with this text for answering questions in the chapter on CONTRACTS. You will not have to answer complex legal questions about the contract, but

you should be familiar with key elements that you will be referencing in a contract in the course of your normal duties.

---

Area and project field offices should, as a standard operating procedure, have the following reference materials:

- 1- Construction Manual
- 2- Complete Set of Georgia Standards and Construction Details
- 3 -Sampling, Testing and Inspection Manuals
- 4 -Field Construction Memo Notebook
- 5 - “As-Built” Set of Project Plans
- 6 – Manual of Uniform Traffic Control Devices (Part 6)
- 7 – Standard Specifications
- 8 – Supplemental Specifications

---

Many of these references and manuals may be available in electronic format through the PC's in the area or project office. Check with your supervisor. (See information in Chapter regarding Construction Manual and Field Construction memos)

You are encouraged to ask your supervisor questions about the research you must do in order to complete this text. Your supervisor may designate

an experienced inspector to help identify the proper or correct references and documentation.

---

## **END OF CHAPTER REVIEW**

### **1-2 Fill in the blanks**

An inspector is the Chief Engineer's \_\_\_\_\_  
representative assigned to make a detailed inspection of contract  
performance of any or all portions of the work or materials.

### **1-3 True or False (circle correct answer)**

The Engineer may request the contractor to remove or uncover any  
work that has been done but has not been finally accepted.

(a) TRUE      (b) FALSE

### **1-4 True or False (circle correct answer)**

As an inspector you are not authorized to alter or waive the  
provisions of the contract or issue instructions contrary to the plans  
and specifications or to act as a foreman for the contractor.

(a) TRUE      (b) FALSE

## CHAPTER 2 – THE CONTRACT

### A - Defined

The **contract** is the written agreement between the Department of Transportation and the contractor stating the obligations of the parties who have signed it. It includes, but is not necessarily limited to these items: performance of The Work, the furnishing of labor and materials and the basis for payment. (See Standard Specifications 101.16)

---

It includes the advertisement, proposal, contract form and contract bond, specifications, supplemental specifications, special provisions, general and detailed plans, notice to proceed and any supplemental agreements that are required to complete the construction of The Work in an acceptable manner. *No oral agreement or orders are to be considered as valid or as a part of the contract.* (See Standard Specifications 101.16)

---

As an inspector, you will be monitoring many aspects of the work performance, checking contractor equipment used and taking measurements or recording information required for making payments to the contractor

---

**2-1** performance, labor ,  
materials

**2-2** the specific section or  
sections of highway

**2-3**

- 1) Special Provisions
- 2) Project Plans including  
Special Plan Details
- 3) Supplemental  
Specifications
- 4) Standard Plans  
including Standard  
Construction Details
- 5) Standard Specifications

There is a hierarchy of documents, which determine which, governs in case there is a conflict . This hierarchy, from most important to less, is:

Special provisions

Project Plans including Special Plan Details

Supplemental Specifications

Standard Plans including Standard Construction Details

Standard Specifications

Also “calculated dimensions will govern over scaled dimensions.”

---

**The Work** refers to all labor, materials, equipment, supervision and other items necessary or convenient for carrying out the Project and carrying out the duties and obligations imposed by the contract.

---

**The Project** refers to the specific section or sections of the highway together with all appurtenances and construction to be performed under the contract.

---

**Special Provisions** are additions or revisions to the Standard or Supplemental Specifications, applicable to an individual project.

---

**Plans** are the approved plans, profiles, typical cross-sections, working drawings and supplemental drawings or extract reproductions thereof, which show the location, character, dimensions and details of The Work.

---

**Supplemental Specifications** are approved additions to or revisions to the Standard Specifications. A typical Supplemental Spec is the 150 governing Work Zone Safety details such as flagging.

---

**Standard Plans including Standard Construction Details** are detailed construction drawings that are applicable to most construction projects. (You will see examples in the *Basic Plan Reading* text. However, you may ask your supervisor or other experienced inspector to show you some standard plan sheets or construction details from the plans on an actual project.)

[Standard 2323 or 2328 for reinforced concrete box culverts are examples, as well as the Standard 4051 for guard rail locations.]

---

The **Standard Specifications** broadly govern how the work is to be done. It is a publication titled: *Department of Transportation, State of Georgia Standard Specifications, Construction of Roads and Bridges*

---

**2-5** BRZLB-121 (12) 01

**2-6** Fulton

**2-7** Kersh Construction  
Inc.

**2-8** 0.170 mile of  
construction of a  
bridge culvert on CR  
485 (Enon Rd.) at  
Enon Creek

## **2-1 Fill in the Blanks**

The contract is the written agreement between the Department of Transportation and the contractor stating the obligations of the parties includes, but not limited to, the \_\_\_\_\_ of The Work, furnishing of \_\_\_\_\_ and \_\_\_\_\_ and the basis for payment.

## **2-2 Circle the correct choice**

The **Project** refers to (all labor, materials, equipment and supervision /or/ the specific section or sections of highway)

## **2-3 List the hierarchy of governing documents starting with the most important**

1- \_\_\_\_\_

2- \_\_\_\_\_

3- \_\_\_\_\_

4- \_\_\_\_\_

5- \_\_\_\_\_



## **B – A Look at a Contract**

**REFER TO THE SUPPLEMENTAL HANDOUTS WITH THE TEXT FOR THE FOLLOWING INFORMATION AND QUESTIONS.** A complete contract is not included in the handout material, but it contains representative material which you will reference when you are on a job.

---

The cover sheet of a contract contains essential information that you must pay careful attention to whenever you are working with information in the contract. Turn to the first page of the handout, it is the cover for a contract that was opened on June 23, 1995.

---

2-4 What is the Contract ID number for this contract ?

Answer:

---

The Contract ID is the number you will use to identify The Work and to reference request for information about it. Two typical uses for the Contract ID are (1) requesting *Construction Reports* and *Contract Status Time Reports*, which you may need to request from time to time

---

**2-10** 90 available days

**2-11** \$150.00

**2-12** \$210.00

---

Note there are also several other types of numbers listed on the cover sheet. These include the *PCN*, *Call Order* and *Projects and Contract No.*

---

A contract could cover several projects and involve several counties. This particular contract has only one project listed.

---

**2-5** What is the Project and Contract No. listed in this contract?

Answer: \_\_\_\_\_

---

**2-6** In what county will The Work be done? [ This will require some analytical thinking. Also some contracts could have several counties listed as well as cities or towns, depending on the type of contract and the type of work.] Answer: \_\_\_\_\_

---

The prime contractor is also named on the contract cover sheet,

**2-7** What is the name of the of the construction company that has been awarded the contract ?

Answer: \_\_\_\_\_

---

Turn to the second page of the handout. It is the second page of the same contract – note the contract ID number.

---

**2-8** What is the work to be done?

Answer: \_\_\_\_\_

---

The second page also tells how much time the contractor has to complete the work and what the penalty is if it is not completed on time. The penalty

for not completing on time is the shown under the “LIQUIDATED DAMAGES” column.

---

Notice in this particular there are two sites listed. One is for the time to complete the project, identified as Site 00 and the other is identified as project completion see Spec. Provision Section 108, Site 01.

---

In a contract there may be particular elements of The Work that must be completed within a certain timeframe and deadline or the contractor faces a penalty. In this contract the site listed as 01 is one of those situations.

---

The dollar amount listed under the “LIQUIDATED DAMAGES” column is the penalty the contractor has to **pay per day** until the contract is complete, if the job is not completed by the contract deadline. Deadlines or “CONTRACT TIME” are defined in terms of either “*calendar days*” or “*available days*,” or “completion date.”

---

NOTE: the definition of calendar days available days and completion date are spelled out in the *Standard Specifications*, which is a part of the contract. {More information about the *Standard Specifications* will be provided in the next chapter.}

---

**2-9** How many days does the contractor, *Kirsh Construction, Inc.* have to complete this contract – be certain to specify calendar or available? Answer: \_\_\_\_\_

---

<b>2-4</b>	B18819-00-000-1
------------	-----------------

**2-14** 511 Bar  
Rein. Steel

---

**2-10** How many days does he have to complete the work at “Site 01”

ANSWER: \_\_\_\_\_

Note: Work at Site 01 begins at a time frame or condition specified in the Contract and is not necessarily an additional amount of time beyond the contract’s completion. The notation to “SEE SPEC PROV SEC 108” refers to the *Special Provisions Section 108* that is in the contract document. The three digit number – 108 – is the number identifying sections in the *Standard Specifications* which was modified, changed or updated by the *Special Provisions*. Section 108 concerns the “Prosecution and Progress” of the work. { More information about *Standard Specifications* in the next chapter}

---

**2-11** What is the amount of liquidated damages to be charged if the contractor does not complete the total work (identified as site 00)?

Answer:

---

**2-12** What is the amount of liquidated damages to be charged if the contractor does not complete the project (site 01) in time?

Answer: \_\_\_\_\_

---

On the second page you may also find other information, for example the Disadvantage Business Enterprise (DBE) goals. {Look at a contract on the project to which you're assigned, what other information is listed on it? Do you know what the information is for? If not, ask your supervisor.}

---

Turn to the third through fifth pages of your supplemental handout and examine them. This is called the **Contract Schedule**. Each proposal and contract has one (A proposal looks like a contract and is used by the contractor in making decisions about the bid.) A proposal is not binding, does not have any price information in the 4<sup>th</sup> and 5<sup>th</sup> columns and does not contain any signatures. *A common error to watch is the inadvertent use of the proposal as a contract.*)

---

**LINE NUMBER** is simply a reference you will use for doing such things as a **Pay Item Report**. This number will also be used to set up Contract Files for the contract. This number is referred to as LIN – Line Item Number. {For further information in the chapter on Construction Manual and Field Construction Memos (FCM's).}

---

**2-13** What is the item description for LIN 0090 in this contract? Note LIN's will be different for each contract.

Answer:\_\_\_\_\_

---

<b>2-9</b>	365 calendar days
------------	-------------------

**ITEM DESCRIPTION** has two significant parts. First, there is a seven digit number. The first three numbers will be a section reference for the *Standard Specifications* and/or *Supplemental Specifications*. Second there is a written description of what the item is.

---

**2-14** What is the section number referenced for LIN 0090 – in question 2-13 above ? Answer: \_\_\_\_\_

---

- |             |                                          |
|-------------|------------------------------------------|
| <b>2-16</b> | It has a <u>different</u> project number |
| <b>2-17</b> | NH-2-1(67)01 Ware                        |
| <b>2-18</b> | Yes                                      |
| <b>2-19</b> | \$1000.00                                |

**APPROX. QUANTITY AND UNITS** column has two elements. First, it defines what the unit is that the item will be paid by. Second, it defines the approximate quantity. This approximate quantity is determined by the Department of Transportation and forms the basis for the contractor's bidding. The quantities are measured in linear feet (LF), gross linear feet (GLF), square feet (SF), square yards (SY), acre (AC), miles (MI), gross linear miles (GLM), gallons (GL), pounds (LB), cubic yards (CY), hours (HR)\*, tons (TN) or each (EA). There is one more designation "*LUMP*" which defines those elements of The Work that are to be paid in a lump sum on a completed/partial completed basis. You may see HOURS\* listed for TRAINING that is required under certain federal aid projects. Also there may be some projects that were let under metric measurement requirements. These will be measured in meters (M), square meters (M<sup>2</sup>),

cubic meters (M<sup>3</sup>), kilometers (KM), hectares (HC), liters (L) and Megagrams (MG).

---

**2-15** How is LIN 005 – 150-1000 Traffic Control – BRZLB-121- (12) 01 to be paid? Answer:\_\_\_\_\_

---

**UNIT PRICE** is the price the contractor bid on that item per unit or for the total “LUMP” work of a given item. If the contract calls for a “TRAINING” item, the hourly rate is determined by federal or other requirements and is given by the Department in the Proposal Document .

---

In addition to the *Contract Schedule*, the contract will have the special provisions that govern The Work. Depending on the type of contract – federal or state project – the contract will also have a section for Disadvantaged Business Enterprise (DBE) goals, Federal Aid Certification requirements, GDOT non-collusion certification, an index and, if appropriate, required contract provisions for federal-aid construction contracts.

---

(Turn to page 6 in your supplemental handouts - **PROPOSAL INDEX**)

---

This page originates in the proposal but is included in the contract as well. It is an index of the modifications and additions to the Standard and Supplemental Specifications for this specific contract

---

<b>2-13</b> 511-1000 Bar Reinf. Steel
------------------------------------------

**2-22** a- shall

**2-23** supervision

**2-24** govern

**2-16** What is another way you can tell this does not involve the same contract as the one you have been using to answer the first 15 questions of this chapter? *(This will require some analysis.)*

Answer

---

**2-17** What is the project number for this index?

Answer

**2-18** Does this proposal index list anything on wage rates?

Answer

---

Turn to page 7 of the supplemental material. This is an example of Special Provisions that appear in a contract.

**2-19** What, according to the Special Provision shown here, is the minimum partial payment? Answer:

---

On page 8 of the supplemental material, there is an example of another Special Provision referencing Section 636 Highway Signs.

---



**2-20 A question for analysis.** In this text we have referenced material from two projects, to which project does this Special Provision apply?

(a) BRZLB-121(12) 01      (b) NH-2-1(67)01

---

The *Standard Specifications*, are a legal part of the Contract and will be covered in the next chapter. However we want to introduce a concept in reference to page 9 in your supplemental workbook material that requires an understanding of some terms.

---

Reference **Section 101 – Definitions and Terms** of the *Standard Specifications* and fill in the blanks for the following terms or expressions.

(Reference for 1993 Standard Specifications)

**2-21**

**(a) SHALL or WILL** – a \_\_\_\_\_ condition. When certain requirements are described with the “shall” or “will” stipulation it is \_\_\_\_\_ that the requirements be met.

**(b) SHOULD** – an \_\_\_\_\_ condition. Considered to be recommended but not mandatory

**(c) MAY** – a \_\_\_\_\_ condition. No requirement is intended.

---

**2-15** Lump

On pages 9 through 11 of your supplemental materials there is a Special Provision with the assigned number: **Section 935 – Fiber Optic System**. Read the introductory paragraph.

---

***This imperative mood may be the sentence structure for future editions of the Standards and we want to introduce you to the concept with this Special Provision.***

---

**2-22** Which of the following expressions, based on the information from Section 101 of the *Standard Specifications* do you think the imperative voice implies?

- a- shall
- b- should
- c- may

---

**END OF CHAPTER QUESTIONS**

---

**2-23** The Work refers to all labor, equipment, \_\_\_\_\_ and other items.

**2-24** The Standard Specifications broadly \_\_\_\_\_ how the work is to be done.

---

**3-1** specifications

# CHAPTER 3 Standard & Supplemental Specifications

This chapter is designed introduce you further to some of the documents you will use in your job of inspecting The Work. Most of the questions will refer you to the *Department of Transportation State of Georgia Standard Specifications Construction of Roads and Bridges 1993 Edition* or *Georgia Department of Transportation Standard Specifications Construction of Transportation Systems 1995 Metric Edition*. <This text will be updated when new editions come out.>

The Standard and Supplemental Specifications are an integral part of the contract as stated in sections 105 and 101 of the Standard Specifications.

**Section 105.04 states:**

**105.04 COORDINATION OF PLANS, SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS:** These Standard Specifications, the Supplemental Specifications, Special Provision, the Plans, Special Provisions and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is binding as though occurring in all. ...”

**2-20** NH-2-1(67)01

**2-21** (a) mandatory,  
mandatory  
(b) advisory  
(c) permissive

**3-5** Special Provisions,  
Supplemental  
Specifications

**3-6** 427

**3-7** falling; rising

**3-8** 427.05 A Weather

**Section 101.16 states:**

“**101.16 CONTRACT:** The written agreement between the Department and the Contractor setting forth the obligations of the parties thereunder.... The Contract includes the Advertisement, Proposal, Contract Form and Contract Bond, Specifications, Supplemental Specifications, Special Provisions, general and detailed Plans, Notice to Proceed, and also any Supplemental Agreements that are required to complete the construction of The Work in an acceptable manner....”

---

**You should also remember** the Standard Specifications is the last item in the hierarchy of documents which control execution of The Work (See § 105.04 of the Standard Specifications – also mentioned on page 11 of this text.)

---

On page 20 of this text, we discussed the three digit section numbers that are convenient reference guides and do not have any bearing on the interpretation of the specifications. {§**101.79 TITLES (OR HEADINGS)**}

---

**Refer to 101.60 and 101.61 and answer the following questions:**

**3-1** What is the “general term applied to all directions, provisions and requirements pertaining to performances of The Work?”

Answer:\_\_\_\_\_

---

---

**3-2** What is the phrase used to refer specifically to the publication?

Answer: \_\_\_\_\_

---

Refer to the TABLE OF CONTENTS of the Standard Specifications – 1993 Edition – to research answers to the following questions:

**3-3** In what section of the Standard Specifications would you find an explanation of abbreviations used in the specifications?

Answer: \_\_\_\_\_

**3-4** A contractor has equipment with treads lined up ready to begin building unpaved shoulders on the project. You tell him that this type of equipment is not permitted on this part of the project. He challenges you by saying the requirement is nowhere in the contract or special provisions. To what section of the Standard Specifications do you turn to show him the requirements?

Answer: \_\_\_\_\_

---

**3-13** Chief Engineer

---

**3-5** Where do you find information about traffic control?

Answer: Either in \_\_\_\_\_ or \_\_\_\_\_

---

**3-6** In what section can you find information about the weather conditions and temperatures that Emulsified Asphalt Slurry Seal can be applied?

Answer: \_\_\_\_\_

**3-7** **COMPLETE THE FOLLOWING STATEMENT:** “Slurry Seal shall not be applied if either the pavement or ambient temperature is 13°C (55°F) or less and \_\_\_\_\_, but may be applied when both ambient and pavement temperatures are 7°C (45°F) or above and \_\_\_\_\_.”

**3-8** What is the section and subsection did the statement above come from in the Standard Specifications?

Answer: \_\_\_\_\_

---

---

**3-9** Section 513 refers to what type of project work?

Answer: \_\_\_\_\_

---

**3-10** In what section can you find information about Rip Rap?

Answer: \_\_\_\_\_

**3-11** Mortar Rubble Masonry and Dry Rubble Masonry is paid how?

- a- Lump sum
- b- per Cubic Yard
- c- not measured for separate payment
- d- per Square Yard

---

**3-12** Compare section 101.62 in the *Standard Specifications – 1993 Edition* with the same section in the *Standard Specifications – 1995 Metric Edition*. What is the current title of the Engineering Executive in the Department? {This will require some logical thinking regarding the sequence of documents.}

Answer: \_\_\_\_\_

**3-2** Standard Specifications

**3-3** 101.01

**3-4** 216.03

While metric measurements are not required in current DOT projects, you may be assigned to some that were let to contract when metric measurements and quantities were required.

---

**3-13** When a document says “the Engineer”, unless otherwise specified, to whom (what official title) is the position it is referring to?

Answer:

---

### **Supplemental Specifications**

Supplemental Specifications are approved additions to or revisions to the Standard Specifications. In addition to being included in the contract, they are periodically printed as separate publications.

---



## PART 2

### CHAPTER 4 – CONSTRUCTION MANUAL, FIELD CONSTRUCTION MEMOS (FCM'S) AND OTHER MANUALS & DOCUMENTS

Manuals are “how-to-guides” for administering Department contracts.

**THEY ARE NOT CONTRACT DOCUMENTS!** In this chapter we will cover the major ones you will be using on a regular basis.

---

Typically these will be (1) the Construction Manual, (2) Field Construction Memos, which are Construction Manual updates, (3) Standard Testing & Inspection Manual, which describe essential test you or testers from the Materials and Research Lab perform, (4) Part 6 of the Manual on Uniform Traffic Control Devices referred to as MUTCD, (5) Bridge and Culvert Inspection Manual and (6) the Department's Manual of Guidance, also referred to as the MOG's.

---

**4-1** Manuals (are / are not) contract documents.

---

**3-9** Precast Reinforced  
Concrete Box  
Culverts Barrel  
Sections

**3-10** 603

**3-11** (b) per cubic yard

**3-12** Chief Engineer

4-2 four

4-3 Public Relations

4-4 Division 1 Chapter 4

Contract documents (see pages 13 and 14 of Chapter 2) may refer to these manuals and these references and this establishes procedures which the contractor must follow in order to do The Work correctly. For example, the specifications may refer to the MUTCD in setting up traffic control.

---

### **Construction Manual**

The Construction Manual was “*compiled to provide **procedural** guidance for the administration of Department contracts. The administration of Department contracts is governed by the contract documents... The governing contract document or specification will be identified at the heading of each chapter containing requirements from a contract provision. The user(s) of this manual should familiarize themselves with the referenced contract provisions to better understand the procedural requirements contained in that particular chapter. ... It must be stressed that this Manual is not a contract document. ... By becoming familiar with the procedural requirements outlined in this manual and the requirements in the various contract documents Department personnel will be better prepared to effectively administer a Department of Transportation contract.*” [ **PREFACE** Construction Manual 1994]

---

**NOTE!** This text will ask you to reference material from the *Construction Manual 1994* – the one in operational use at the time of its publication. The manual under goes revisions from time to time, and an attempt will be made to keep this Engineering Skills Development text as current as possible. Therefore detailed references/questions will be subject to change. **As always, follow the information in the most current manuals rather than information provided in this text.**

---

### **Field Construction Memos (FCM's)**

Field Construction Memos (FCM's) give guidance to field construction personnel on a non-project specific basis. Issued by the Construction Division, these memos are kept in a 3-ring binder in construction as well as field offices and provide policy guidance for administering the specifications.

---

FCM's will have a heading that looks something like this:

#### **Field Construction Memo 108-98-104**

Orig. Office: Office of Construction

Topic Projects Behind Schedule

Contact: Tom Turner

Subject: Steps for Responding

Telephone: 656-5306

Date: January 26, 1998

**4-1** are not

- |             |                                                           |
|-------------|-----------------------------------------------------------|
| <b>4-7</b>  | equipment lists;<br>contractor's report<br>of performance |
| <b>4-8</b>  | The FCM because<br>it is more recent.                     |
| <b>4-9</b>  | Yes                                                       |
| <b>4-10</b> | 100-98-115                                                |

---

The first three digits are the Standard Specification number. The next two digits are the year it was issued and the last three digits are sequential numbers assigned to it by the Construction Division.

---

Refer to a Construction Manual to answer the following questions:

**4-2** How many divisions does the manual have?

Answer

**4-3** Which one of these items IS NOT a DIVISION in the Construction Manual?

- (a) General
- (b) Inspection Procedures
- (c) Forms
- (d) Public Relations
- (e) Utilities and Miscellaneous Construction

**4-4** In what division and chapter would you find information about a project file management system in the Construction Manual?

Answer: \_\_\_\_\_

---

- 4-5** Turn to chapter four and fill in the blanks. "Project records shall contain the actual \_\_\_\_\_ of construction. They shall be \_\_\_\_\_ and complete. They also must be \_\_\_\_\_, well-organized and \_\_\_\_\_."
- 4-6** The person actually keeping the records shall have \_\_\_\_\_ knowledge of the plans, Specifications and Contract requirements; the ability to perform \_\_\_\_\_; and the ability to \_\_\_\_\_ and \_\_\_\_\_ source documents."
- 

This portion of the Construction Manual contains a section on **File Management System** that provides a directory of files necessary for the effective management of the administrative requirements of a DOT contract. Refer to it and then refer to the FCM ring binder to **FCM 100-98-114**. This FCM updates the Construction Manual regarding the File Management System. **NOTE:** *You should make an effort to review all documents, manuals and other references used on the project on a regular basis. However, you should make it a practice to check the FCM's frequently, the FCM's are designed to respond to changing field conditions which affect how you would do your job.*

**4-14** The Project Engineer

**4-15** No

---

Compare the “A. Directory of Files” in the Construction Manual with the FCM’s (100-98-114) “I - ADMINISTRATIVE” section. Both have 22 items.

---

**4-7** There are two items that are different. What are they?

Answer: The Construction Manual has \_\_\_\_\_ listed which the FCM does not have listed and the FCM has \_\_\_\_\_ listed which the Construction Manual does not have listed.

**4-8** Which list takes precedence and why?

Answer

---

---

Refer to the FCM **INDEX**. Notice it has five columns. The section number refers to the references in the specifications. You probably noticed a reference to 100 which is NOT in the Standard Specifications. The 100 designations are administrative procedures that support the department’s role in monitoring The Work performance.

**4-9** Is there a FCM with the topic “Project Documentation?”

(a) YES (b) NO

**4-10** What is its reference number? Answer: \_\_\_\_\_

---

Read FCM 100-98-115.

**4-11** What section in the *Construction Manual* does this memo reference?

Answer: \_\_\_\_\_

---

The documents listed in the FCM 100-98-114 include "Contractor's Performance Reports."

**4-12 A question for thought:** With the research material you have available, (a) where would you go to find a copy of this report form and (b) to what other resource would you turn to be assured it is the most current form to use?

Answer: (a) \_\_\_\_\_ (b) \_\_\_\_\_

---

A note about forms: Forms change over the years and often there are revision dates printed in a corner.

**4-13** What is the revision date for DOT Form 479 *Report of Contractor's Performance* that is currently in use?

Answer: \_\_\_\_\_

---

If your answer did not agree with the response on page 41, did you check the FCM?

**4-5** facts, current, legible  
concise

**4-6** working, calculations,  
obtain, maintain

**4-20** crossed out

---

Return to the *Construction Manual* and look at Division 1 Chapter 1. Read the material and answer the following questions.

**4-14** Who is to conduct the Pre-Construction Conference?

Answer: \_\_\_\_\_

---

Refer to FCM 105-98-107

**4-15** Can pre-construction conferences be recorded or video-taped?

(a) Yes                      (b) No

---

Turn to Chapter 5 Division 1 in the *Construction Manual*.

Source Documents provide **direct evidence or testimony** that work was performed and done in compliance with the Contract. The Contractor is paid according to information provided in — (Construction Manual Chapter 5 page 5-1).

---

**Source documents** include but may not necessarily be limited to:

Inspector Reports / Contract Diary

Field Quantity Books

Cross sections (original and final)

Weight tickets

Invoices (under certain conditions)

Materials (inspection/testing/certification) documentation as well as



certain records for salvage and materials not incorporated in the work.

---

**4-16** Source Documents provide \_\_\_\_\_ evidence or testimony that the work was performed in compliance with the specifications.

**4-17** The Contract Diary (is / is not) a source document. (See Chap 6)

---

Refer to Chapter 6 of the *Construction Manual* for answers to the following.

**4-18** Entries in the Contract Diary can be made in pencil.

(a) TRUE            (b) FALSE

**4-19** The Contract Diary shall be kept in a bound book furnished by the Department.

(a) TRUE            (b) FALSE

**4-11** Chapter 5,  
Division 1

**4-12** (a) Construction  
Manual Division 3

(b) the FCM

**4-13** 10/98

**4-20** Incorrect or erroneous information shall be (crossed out / whited out / erased), corrections made in the available space and initialed by the person making the correction.

**4-21** 161, 700

**4-22** S.T.I. Vol. 1  
627-5  
627-7  
or Quantity Book

---

The *Construction Manual*, in Division III, has the various forms used for inspection and monitoring the work and they are available in electronic format. In Division I Chapter 5, the procedures for filling out the reports are outlined.

---

#### **INSTRUCTIONS FOR ACCESSING DOT INSPECTOR REPORT FORMS**

- 1- Go to *Windows Explorer™*
- 2- Then go to "TOOLS"
- 3- Then "MAP NETWORK DRIVE"
- 4- Enter a Drive Letter
- 5- Then type in \\gdot\_go\_sv35\forms

---

#### **Inspection Procedures**

Division II of the *Construction Manual* outlines essential inspection procedures. On the following page is a facsimile of an inspection procedure from this division. Look at some of its features.

**Inspection Procedures  
Item 161 Temporary Grassing  
(Water Pollution Control)**

**General:** Same as item No. 700 - Grassing – Complete

**Standard Specifications (and Special Provisions)**

Stage of Construction	Points of Inspection	Inspect Plants and/or Equipment	Required Documentation		See Remarks
			Vol.1 S.T.I. Manual	Insp. Report No. 627-5, 627-7 or Qty. Book	
Prior to application	1.Determine location and type of seed needed				
	2.Material Certification		<b>X</b>		<b>X</b>
	3. Ground preparation				
During construction	1. Application of lime and fertilizer (if used)			<b>X</b>	<b>X</b>
	2. Application of seed or mulch				
Upon achieving a satisfactory stand of grass	1. Measure for payment			<b>X</b>	<b>X</b>

**REMARKS:** Same as Item No. 700 – Grassing – Complete

**4-16** direct

**4-17** is

**4-18** FALSE

**4-19** TRUE

**4-25** Approved (silt fence)  
fabric \* see  
*REMARKS* section  
about QPL 36

**4-21 Question for thought:** What Standard Specifications and/or Special Provisions cover the item for the inspection procedures involved?

Answer: \_\_\_\_\_ and \_\_\_\_\_

---

**4-22 Question for thought:** What documents or manuals do you need to perform the required inspections for these specifications other than the Standard Specifications, Supplemental or Special Provisions?

Answer: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

or \_\_\_\_\_

---

In answering question 4-22 you should have made the connection between the 3-digit numbers and the numbers assigned to Titles or Headings of the Sections in the Standard Specifications.

---

You may have been puzzled by the reference to “Vol.1 S.T.I. Manual. The S.T.I. Manual is the *Sampling Testing and Inspection Manual* used by both technicians in the Department’s Materials and Research Lab and by Construction Inspectors to assure the materials used on the projects are quality materials meeting the intent of the contract. This manual should be available in the Project Office and is being made available through electronic format. The purpose of the S.T.I. manual is not a contract document. It sets a standard guide for testing and inspecting highway materials and construction.

---

Turn to Division II in the Construction Manual for the “Inspection Procedures” and find *Item 171 Temporary Silt Fence*.

---

**4-23** What are the inspection points ***prior to construction***?

Answer: (a)\_\_\_\_\_ and \_\_\_\_\_

(b) check material \_\_\_\_\_

---

**4-24** Refer to the appropriate Standard Specification and assume there are no Special Provisions in the contract which would change the requirement. What is the basis for payment?

Answer: \_\_\_\_\_ per cent of the Contract Price bid per linear foot will be paid when each fence is \_\_\_\_\_in

\_\_\_\_\_. The remaining \_\_\_\_\_% will be paid at removal and acceptance.

---

Note in the "Remarks" section that prior to construction the inspector needs to check the material certification.

---

**4-25** What is the material that needs to be checked for approved certification? (See appropriate Standard Specification Heading as indicated in the REMARKS section of the Inspection Procedure.)

Answer: \_\_\_\_\_ to be used on the project.

---

**Qualified Products List (QPL)** The QPL is a listing of manufacturers and their products which have been approved by the Department's Materials and Research Office to be used on its construction projects found in volume 2 of the S.T.I. manual. The products listed in the QPL's have been evaluated by the Materials and Research Office and have proven their capability of meeting the requirements for the appropriate sections of the Standard Specifications, Supplemental Specifications and Special Provisions.

---

QPL's allow the Inspector to accept the approved materials based on their listing in the document. It saves time and effort. Without this list, materials

**4-26** 881

**4-27** 171

**4-28** 171.02A

would require time consuming quality checks before they could be used in The Work (project).

---

Turn to **SECTION 171 – TEMPORARY SILT FENCE** in the Standard Specifications and look at the sub section **171.02 Materials**. Shown on the chart are six standards (or tests) the three types of silt fence must undergo to meet the Department’s qualifications to be used on a project. (Remember as an inspector you have the responsibility for assuring not only that the work is done correctly but that equipment and materials meet the specifications.) Products on the QPL have already undergone the required tests, thereby reducing the time it would take if the pre-quality checks were not done.

---

The QPL isn’t the only way an inspector can determine if materials meet the required quality criteria. Depending on the type of material, *manufacturer’s certification*, which is a statement of compliance with the GDOT specifications is acceptable under certain specified conditions; *certified mill test report* contain details of the tests that were performed on the material are acceptable and some CPT, CMPT or CCT numbers indicate they have been inspected by a certified manufacturer’s inspector and are acceptable under specified conditions.

---

**4-23** location and staking ; certification

**4-24** 75, complete, in place, 25

If materials arrive on the project that are not properly certified, the inspector must not allow them to be used until the Materials and Research (Lab) personnel have examined the materials and accepted them as meeting the quality criteria. If the materials are rejected they must not be used, of course. Materials and Research should be notified immediately if uncertified/unapproved materials are on the work site. Also improperly handled or stored materials, even if on the approved lists or certification process, are grounds for rejecting their use on the project.

---

In the *Engineering Skills Development Supplemental Workbook*, you will find (1) a *QPL Table of Contents* and (2) two QPL's (No.'s 28 and 36). Look at the material and answer the following questions.

---

**4-26** What section in the Standard Specifications does QPL 28 cover?

Answer:

---

**4-27** What section in the Standard Specifications does QPL 36 cover?

Answer:

---

**4-28 Question for thought:** What is the section / sub-section and letter in which this paragraph appears: "Approved silt fence shall be listed in the Department's Qualified Products Manual. Approved fabrics must consistently exceed the minimum requirements of this Specification as verified by the Office of Materials and Research. Removal from the



Qualified Products Manual will prohibit the use of the fabric in Department of Transportation work until the product acceptability has been reestablished to the satisfaction of the Department.” (Standard Specifications – 1993 Edition.)

Answer: \_\_\_\_\_

---

Look in the FCM at 171-91-08 and answer the following questions:

---

**4-29** What is the unacceptable product brand name?

Answer: \_\_\_\_\_

---

**4-30** What is the date of the FCM?

Answer: \_\_\_\_\_

---

**4-31** Check QPL 36 in your supplemental workbook. Is the company or product listed? (Page 17 of Supplemental workbook)

(a) YES

(b) NO

---

**4-32** What is the revised date of QPL 36 in your supplemental workbook?

Answer: \_\_\_\_\_

---

As an inspector you must be thoroughly familiar with the contract requirements, the standard and supplemental specifications, special provisions, special drawings, construction details and/or special situations etc. that are a part of project. Questions 4-28 through 4-30 were designed to help you realize the importance of checking all resources / manuals and other materials before taking any actions or making comments in the Contract Diary, the Inspectors Diary, etc. ( **See Construction Manual Division 1 Chapters 4, 5 and 6. )**

---

#### **“As-Built” Set of Project Plans**

As-Built plans are a complete set plan sheets that have any changes or deviations made during construction marked in red ink. These plans are prepared as the project progresses. ( **See Construction Manual Division 1 Chapter 5. )**

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#### **Manual of Uniform Traffic Control Devices (MUTCD) Part 6**

The MUTCD Part 6 provides guidance in traffic control. It is referenced in the Standard Specifications and work zone traffic control plans are expected to conform to the guidance offered in it.

---

#### **TOPPS (Manual of Guidance or MOG)**

*TOPPS or Transportation On-line Policy and Procedure System*

and sometimes referred to as the (Manual of Guidance) or MOG's contain the policy and procedural guidelines for all areas of the Department's operations. There is sample *TOPPS* in the supplemental workbook page 50.

---

**4-33** What is the topic and number ?

ANSWER: \_\_\_\_\_ # \_\_\_\_\_

---

**4-28** see page 46

**4-29** MIRAFI 100 SX

**4-30** 12/17/91

**4-31** NO

**4-32** June 1997

## CHAPTER 5 CONCLUSION

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This introductory text only skimmed the surface of some of those many items with which you must be familiar in order to perform your duties as an inspector on Department construction projects.

---

It can't be overemphasized that knowledge of the documents and procedures mentioned here and documents and procedures that were not mentioned, is an essential requirement of your job.

---

Quality assurance service, in its broadest application, is the heart of your responsibility in construction inspection, regardless of your title. Peter Drucker, in his book *Post-Capitalist Society* said: "Already an estimated two-thirds of U.S. employees work in the services sector, and 'knowledge' is becoming our most important 'product.'"

---

You may not realize it, but as an inspector, you are in the service sector. Yes, you perform certain physical tasks in your job but the tasks collect knowledge, take the vital signs, if you will, of how well The Work is going. In the final analysis, you **are paid for the knowledge you posses** about the construction inspection process as required by the Georgia Department of Transportation.

---

You become more valuable to the GDOT, and ultimately yourself, the more you know about construction contract requirements. Acquiring

knowledge is not a static, one-time event. For example, the information in FCM's illustrate how circumstances change which affect decisions throughout the project.

---

You will be covering three groups of topics relating to construction inspection on GDOT construction projects. These groups are roughly divided into (1) general knowledge requirements associated with construction; (2) initial "ground-breaking" projects and (3) the "surfacing" or "finishing" projects.

---

More specifically they are:

**Group 1**

- Introduction to Engineering Skills Development
- Basic Highway Math
- Basic Plan Reading
- Basic Construction Surveying

**Group 2**

- Excavation and Embankment
- Erosion Control
- Base Course Inspection
- Asphalt Paving Inspection

<b>4- 33</b> 5435-2 Pre-bid Discussion with Contractors and Suppliers
--------------------------------------------------------------------------------

### **Group 3**

#### **Portland Cement Concrete Paving Inspection**

#### **Bridge and Structures Inspection** formerly Structural Concrete Inspection

---

The order of the text within each group does not necessarily need to be followed. However the group order should be followed. You also should successfully complete a text before moving on to another text.

---

Someone has said, “It’s what you learn after you finish your training that really matters.” Upon completion of the three groups, you should continue increasing your knowledge about the many aspects of construction inspection. Knowledge is not a static thing. Now that you have completed this text, go on to the next step.

---

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